

# **Highways, Urban Renewal, and Patterns in the Built Environment:**

Exploring Impacts on Atlanta Neighborhoods

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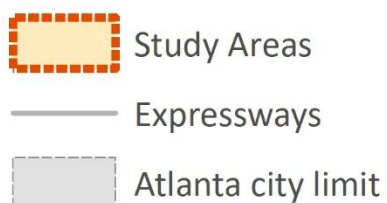


# Introduction

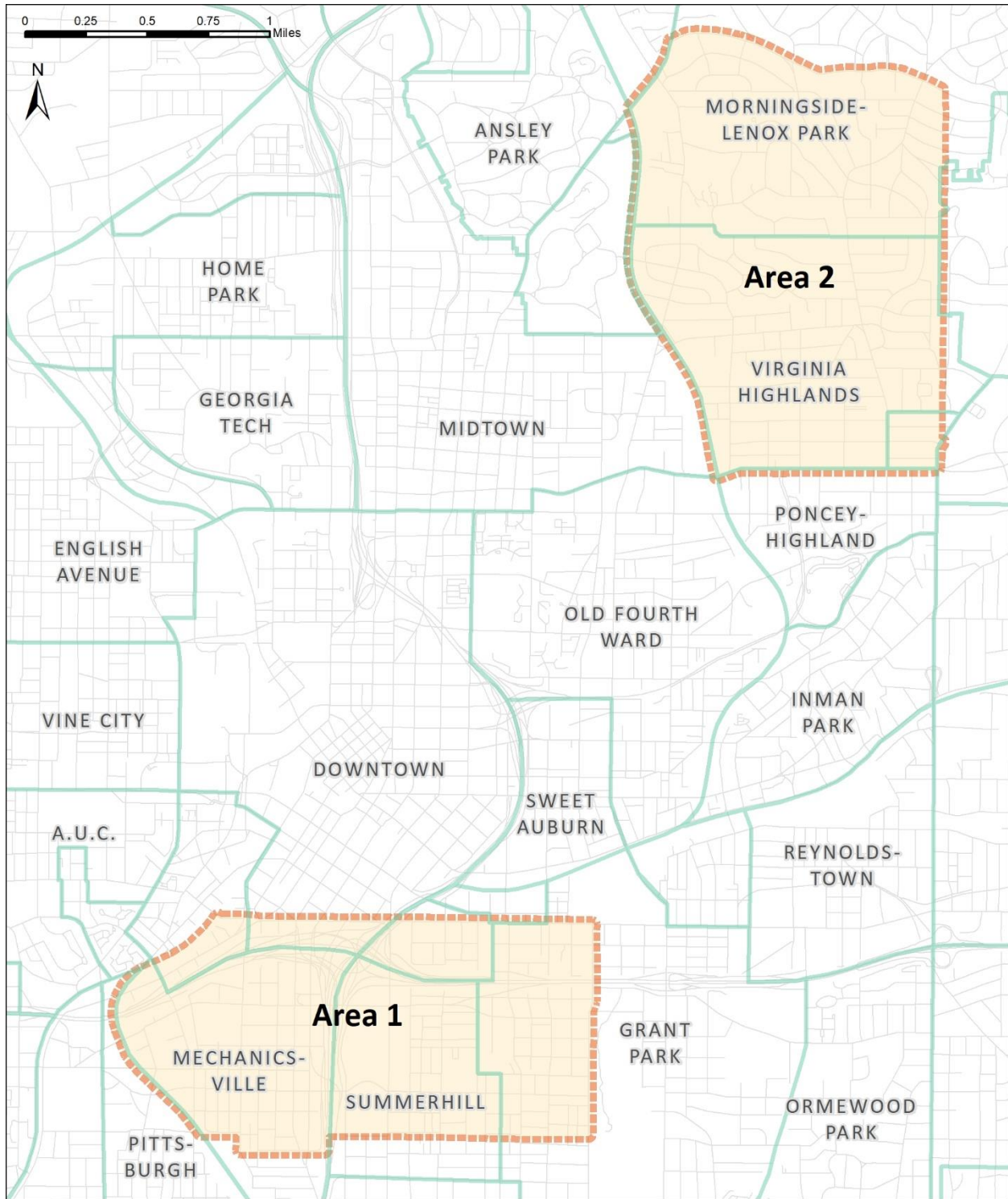
During the mid-twentieth century, cities across the United States underwent drastic changes known broadly at the time as “urban renewal.” In many cases, these changes included widespread demolition of varied neighborhoods in the established urban core to make way for uses deemed more appropriate, such as Interstate highways, public housing projects, and other large-scale public developments or private developments with public backing. Atlanta, Georgia serves as a prime example of this trend, as large swathes abutting its historic downtown were leveled in the 1950s and 1960s for construction of Interstate 75-85 (the Downtown Connector), Interstate 20, and Atlanta Stadium (later known as Atlanta-Fulton County Stadium and subsequently demolished). Significant additional parts of Atlanta’s inner city were similarly cleared later in the twentieth century for construction of landmarks such as Freedom Parkway, the Georgia World Congress Center, Turner Field, and various other projects. Such changes obviously had a profound disruptive impact on neighborhoods that existed previously.

In this study I explore and quantify changes in built environment patterns between the time immediately before the Interstates were built (circa 1949) and today, in two selected study areas (which I will call Area 1 and Area 2) within Atlanta’s pre-Interstate city limits. Area 1 includes portions of the Mechanicsville, Summerhill, and Grant Park neighborhoods south of Downtown that were heavily altered by construction of the Interstates, Atlanta Stadium, and Turner Field. Area 2 includes, for comparison, portions of the Virginia Highlands and Morningside neighborhoods that shared some similar physical characteristics and *would have been* altered by a planned highway known as Interstate 485 which was never built. A more in-depth study might consider additional neighborhoods throughout the city, or neighborhoods with similar characteristics and history in other American cities, but the labor involved in acquiring and preparing historical data has limited my geographic scope as such.

The aspects of these neighborhoods on which I chose to focus are some of the most basic elements of the built environment: land use, parcels, building footprints, and street networks (pedestrian networks would also be a fascinating indicator of change, but historical data on this would be difficult to obtain and verify). In addition to simply exploring physical changes in these elements, I also present some analysis of how well the study areas adhere to certain principles of smart urban development patterns, including granularity of land use and density of street intersections.



*Figure 1. Context Map*



-  Study Areas
-  Current neighborhood boundaries
-  Current streets

*Figure 2.  
Neighborhood  
Context Map*

# Background

## History

First, I will give some historical and descriptive context to describe the study areas. The two study areas I chose are roughly the same size in land area, and both comprise neighborhoods that were entirely or mostly established immediately prior to construction of the Interstates. Area 1 lies immediately adjacent to Downtown Atlanta to the south and is known as the oldest primarily residential area in the city, while Area 2 lies immediately adjacent to Midtown Atlanta to the east (although it is separated from Midtown by the BeltLine, which formed a barrier as an actual railroad in pre-Interstate times). Both areas historically contained mostly single-family homes on small lots, with scattered pockets of higher-density residential, commercial, and institutional uses, with some limited industrial areas on the edges along railroads. I chose the boundaries of these areas by visually selecting contiguous areas bound by major streets and railroads that include roughly consistent development patterns and interconnected street networks throughout. Area 1 was also limited on the south side by availability of digitized historical data on building footprints and streets, while Area 2 was demarcated on the east side by the Fulton/DeKalb county line.

The neighborhood of Summerhill was the inspiration for this study, because it experienced a vast amount of mid-century demolition. Summerhill's current boundary is defined by the Interstates on the north and west, but prior to their construction the neighborhood probably extended considerably further into the areas currently occupied by the massive interchange that now forms the epicenter of Atlanta's highway network. Before construction of these highways, Area 1 (including Summerhill, most of Mechanicsville, and the western half of Grant Park) was a consistent, cohesive grid of streets with many direct connections to Downtown. Then, during the 1950s, a wide swathe of land was cleared to build Interstate 20, stretching from east to west across the northern portion of the area, while Interstate 75-85 bisected the area from north to south. The interchange of these two highways necessitated clearing of an even wider area. Not long after, during 1964-1965 (Fenster, 2006), Atlanta Stadium was built on additional tracts adjacent to Interstate 75-85, which required more large-scale demolition. In addition to the numerous homes, businesses, schools, and churches that were lost for these projects, the street grid of the area was also severely impacted with many connections being severed. Later, further sections of Area 1 were cleared for park space (Phoenix I and II Parks), and yet another stadium (Turner Field in the mid-1990s) (Starrs, 2006). Compiled aerial photography from 1949, just before all

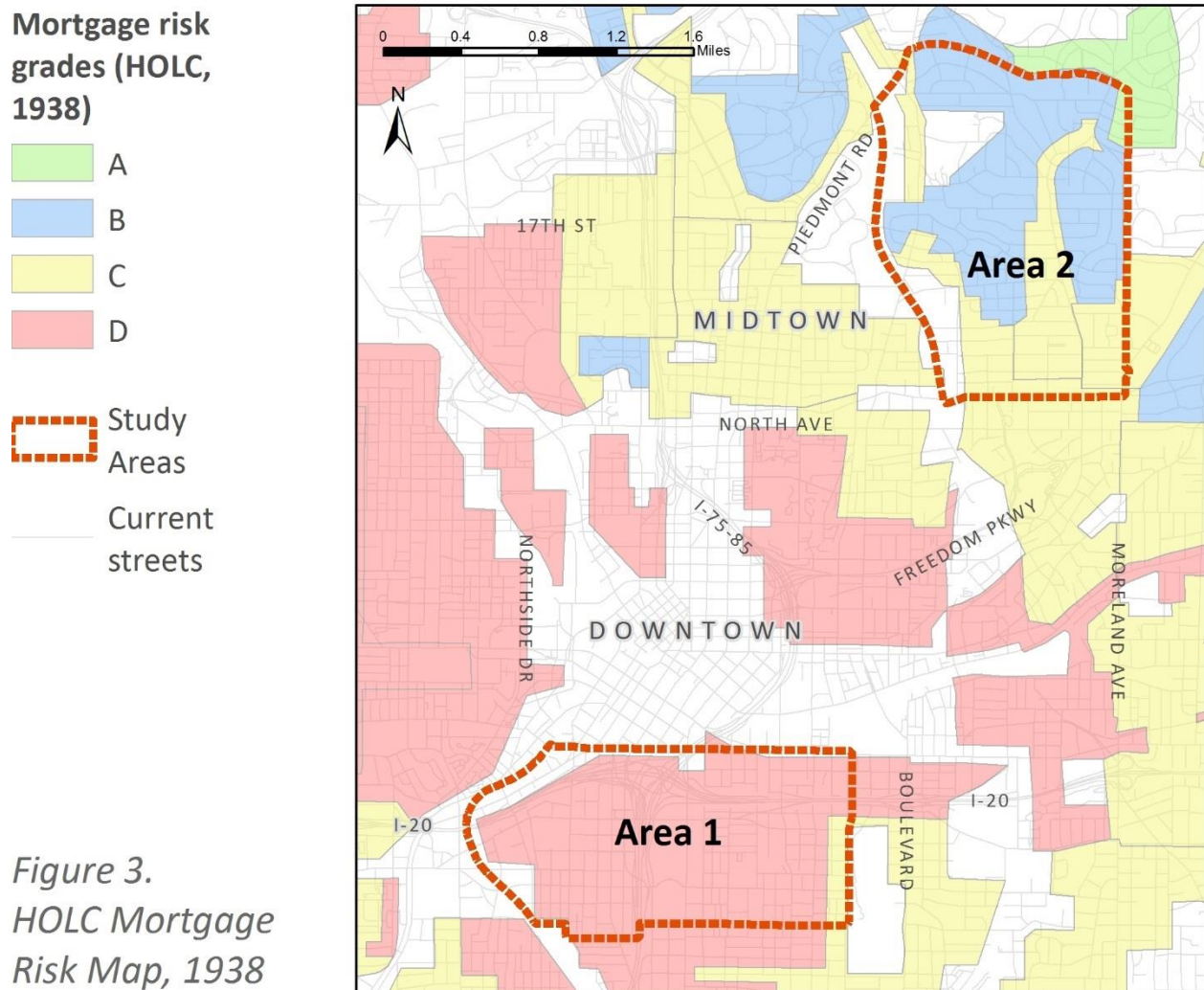
these developments began, makes it possible to see and analyze the drastic differences between then and now in this study area.

Planning documents from the 1930s-1950s show some justifications which might have been used at the time for clearing of the aforementioned neighborhoods, particularly in the mid-century era. In a mortgage loan risk map from the Home Owner's Loan Corporation, dated 1938, the entirety of the demolished swathes in Area 1 is graded "D," the worst of the four risk designations used on the map, which were colored red (University of Richmond, 2018). Maps like this one were the inspiration for the term "redlining," which generally refers to racially biased policies which labeled neighborhoods too risky for mortgage approval based on factors including the presence of African-Americans or other minority populations. Another map from the Atlanta-Fulton County Joint Planning Board, dated 1958, designates almost all of the land in Area 1 as "rehabilitation" or "clearance" zones (GSU, 2018). The neighborhoods in Area 1 were, in 1940, indeed populated by a racially diverse, high-minority population, which continues along with high levels of poverty today, especially further west in the area.

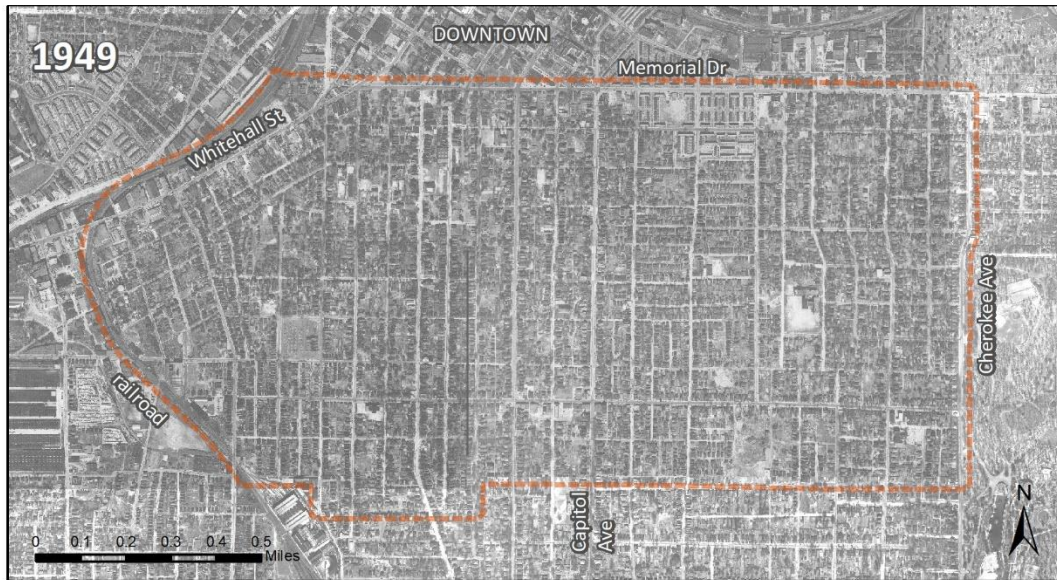
Meanwhile, Area 2 contained a comparably consistent street grid and mixture of residential density, businesses, and other uses in its southern half (the Virginia Highlands neighborhood) prior to the Interstates. The northern half (part of the Morningside neighborhood) was mostly but not yet fully built out in 1949 but already contained a well-connected (though not rigidly gridded) street network, and it was dominated by single-family homes on small lots comparable in size to those in Area 1. I chose to study this area for comparison because planning documents from the early 1970s show potential routes for a highway that would have bisected Area 2 from north to south, if it had been built (GSU, 2018). It is therefore useful to look at the prior and current state of an area that ultimately was not severed by highways and other massive projects, as compared to an area that was.

In the same mortgage risk map referenced previously, the residential portions of Area 2 are mostly graded "B," with some pockets graded "C" (on a scale of A to D). After combing through dozens of historical maps regarding planning policy in Atlanta, I did not find any that designated parts of Virginia Highlands or Morningside as [urban renewal designation] or anything similar. Demographically and economically speaking, the area was predominantly occupied by white majority populations in 1949, and today it remains so along with higher incomes as compared to Area 1.

While these socioeconomic indicators and policy designations are worth noting, this study will only suggest a potential link between them and the eventual outcomes of neighborhood demolition (or lack thereof), as there are potentially other factors which may have played a part in deciding whether or not to build a highway and which warrant much further investigation. I will instead focus mostly on examining changes in physical patterns of the built environment which have resulted from mid-to-late-twentieth century urban demolition and developments.








 Study Area 1  
boundary

Figure 4.  
 Area 1:  
 Aerial Imagery,  
 1949 vs. current



Study Area 2

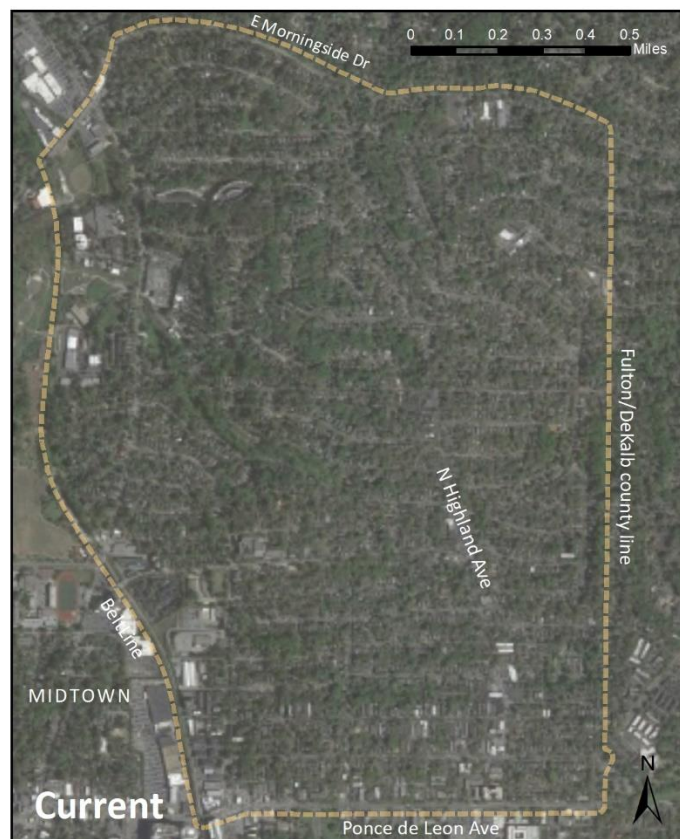


Figure 5.  
Area 2:  
Aerial Imagery,  
1949 vs. current

## Measuring a Smart Urban Fabric

In assessing the physical impact of changes to urban development patterns in the study areas, it is useful to reference concepts related to what is widely known as “smart growth” in the urban planning community. The concept of smart growth has been widely used by various planners in recent decades to mean various things, usually as a framework for guiding new development, but it generally espouses concepts that can also be used to judge the quality of an existing urban fabric. In addition to visualizing physical changes resulting from highway construction and other large developments, this study also analyzes physical patterns to discover how well they achieve some applicable goals of common smart growth guidelines.

One such commonly used measure is granularity of land use patterns. In “Best Development Practices,” Ewing (1998, p. 7) explains that “grain” of development pattern means “typical area devoted to a single land use. Individual apartment buildings interspersed among single-family homes create a fine grain. Large apartment complexes separated from single-family neighborhoods produce a coarse grain.” Ewing describes advantages of a fine-grained land use pattern, including “freedom afforded those who cannot drive when destinations are within walking distance,” “positive impact on residential property values when commercial and civic uses are close by,” and “a greater sense of community when commercial and civic uses are mixed in with residential.” Thus, I use GIS analysis to compare the granularity of land use in my study areas in 1949 to that of today.

A second common physical measure of smart growth guidelines is density of street intersections. In “Smart Scorecard for Development Projects,” Fleissig (2002) defines granularity in terms of the street network instead of the land use pattern. Fleissig explains that “Increasing the number of intersections increases pedestrian activity and transit feasibility”. So, in addition to preventing vehicle traffic from being bottlenecked into a few thoroughfares, a more interconnected street grid can also create a more vibrant, engaging urban environment and encourage more pedestrian activity. Therefore, I also use spatial analysis to isolate street intersection points and provide a measure of density of intersections for the study areas for 1949 and today.



# Data

To begin with, the most essential datasets used in this study were aerial photography from the two key time periods, 1949 and current. The availability of historical imagery from just a few years before the Interstates were built made it possible to verify and digitize as needed the vector feature classes used to map certain elements of the urban fabric. This historical imagery was obtained from Georgia State University (GSU, 2018 (1)) as one high-resolution aerial photo mosaic covering the entire Atlanta city limits at the time, which was assembled from over 100 georeferenced photo tiles by researchers at the GSU library. The current aerial photos used were obtained as a WMS service provided by the Georgia Geospatial Information Office (GIO, 2018) for use by government entities and universities.

## Building Footprints

To map building footprints for both time periods, I was able to find digitized footprint spatial datasets representing both today (covering the entire study areas) and 1928 (covering roughly 75% of the study areas). I began with an assumption that buildings for 1949 (my historical time period of interest) would be more similar to 1928 (which of course proved to be true due to the massive urban changes that took place in the mid-century era as described earlier).

Footprints for 1928 were obtained from researchers at Emory University (Emory, 2018 (1)). These were originally digitized at Emory based on a map dated 1928 which was scanned and georeferenced. I used ArcGIS to first clip this feature class to the study area and then view the footprints over the 1949 aerial composite image. By doing so I was able to visually verify whether the 1928 buildings matched the 1949 image, retain the buildings that match, and eliminate the ones that don't. As expected, a large majority of the 1928 buildings appeared to still be present in 1949. For the portion of the study area not covered by the 1928 buildings, I used the same process with the current building feature class over the 1949 aerial. Where the buildings in the 1949 image did not match either 1928 or today, I manually digitized footprints to fill in the gaps.

For current building footprints, I found two alternative data sources. First, I planned on using a feature class produced by Fulton County representing current building footprints as of 2017; however, this dataset was unfinished and contained many overlapping footprints that were apparently created at different time periods. Then, I found a nationwide dataset of building footprints generated by

Microsoft/Bing, in JSON format (Microsoft, 2018). These footprints were derived from recent aerial imagery through a machine learning process which identified pixels that represented structures, converted them to polygons, and then generalized and rotated those polygons.

I chose to use the Microsoft footprint data after viewing sample areas which represent neighborhoods that I am familiar with and comparing to recent aerial photos for accuracy. I determined that this dataset was more accurate than digitized building footprints obtained from Fulton County. These building footprints obtained from Microsoft were released to the public free of charge as statewide JSON files. Using QGIS, I isolated building footprints for Fulton and DeKalb counties and then saved the temporary result as a shapefile. I then used ArcGIS to convert the shapefile to a feature class and project to State Plane Georgia West. Next, still using ArcGIS, I selected features that intersect the study area polygons, and exported those to a new feature class. Now I was left with one feature class of current building footprints for the study areas. Once this feature class was prepared, I verified the footprints visually by viewing them over the recent aerial images of the area in ArcGIS, much the same as I did for the 1949 buildings, and then manually digitized or adjusted any footprints that were not consistent.

For both the 1949 and current buildings, I manually removed any small footprints that appeared to represent accessory structures such as garages, because while these may contain residential units, I had no way of verifying that, so I decided to only map primary structures. Neither of the building footprint datasets used contained much useful information in their attributes. To assign a land use category to each footprint, I performed a spatial join in ArcGIS using land use polygons (described in the following paragraphs). I will also note that it would be useful to know which of the footprints are/were vacant at either time period, as surely some of them would be vacant, but unfortunately this information was not readily available.

## Land Use

To map land use, I obtained a digitized spatial dataset from Atlanta Regional Commission representing land use categories from 2012 (ARC, 2018 (1)) and adapted it to today. However, for 1949, the closest data available was a scanned, georeferenced image of an existing land use map from the Georgia State University Library (GSU, 2018 (2)) which was dated 1952 – unfortunately, it would be necessary to digitize these land use categories.

To prepare the (circa) 1949 land use data, I first used the Feature to Polygon tool in ArcGIS to create polygons from the 1928 street grid (this data will be described later) within the study areas. I then placed these polygons over the 1952 land use map and manually divided them into smaller pieces where necessary, roughly approximating the areas for each land use category that were represented on the map image. Next, I created a domain for the geodatabase with land use categories as specified in the legend of the 1952 map (plus several more as I deemed appropriate), and I assigned each polygon a land use value in a new field using this domain. This process was also guided by the 1949 aerial composite image, so that the polygon categories would more accurately reflect realistic proportions of the uses that existed at the time.

To prepare current land use data, as mentioned earlier, I started with a feature class obtained from Atlanta Regional Commission containing polygons with land use categories for the entire metro region (as of 2012). I clipped this data to the study areas in ArcGIS and quickly realized that it was not prepared with the same level of detail as the 1952 map, which, although it was apparently colored by hand, contained impressive lot-level detail. So, I visually compared the 2012 land use polygons to the recent aerial imagery, and manually divided or altered the polygons as necessary to create a higher level of consistency and detail. I then added a new field using the same domain for land use categories that was used in the 1949 land use data, and I assigned each polygon a corresponding value for this field for consistent comparison between time periods.

The land use categories assigned to digitized polygons for both time periods and subsequently displayed in maps are as follows:

Land Use Category Used	Used in 1952 Map?
Residential: single-family/two-family	Yes
Residential: apartment/high-density	Yes
Commercial	Yes
Industrial	Yes
Institutional	Yes
Park	Included with Institutional
Open Space (including vacant/undeveloped)	Yes (but not labeled)
Infrastructure (including highway/railroad/utility)	
Stadium	

*Table 1. Land Use Categories Used*

## Streets

To map street networks, I was able to find digitized spatial datasets for both today and 1928. Like the historical building footprints, the historical street data was originally digitized at Emory University, based on the same map dated 1928 (Emory, 2018 (2)). The current streets feature class was obtained from Atlanta Regional Commission, representing street centerlines for 2014 (ARC, 2018 (2)).

Both streets feature classes were first clipped to the study areas in ArcGIS, including an extra 100 feet of space surrounding the study area boundaries to capture centerlines that are closely aligned with the boundary. To verify that street network datasets were accurate for the desired time period, I prepared them in a way similar to the methods described earlier, comparing them to aerial imagery and manually adjusting accordingly.

## Other Data

Other informative spatial data used for descriptive maps and context of the study areas are as follows:

- Digitized feature class of mortgage risk categories, based on a map produced by the Home Owners' Loan Corporation, dated 1938 (Mapping Inequality, 2018).
- Scanned, georeferenced map showing a proposed alignment of Interstate 485 (which was never built), dated 1972. Obtained from Georgia State University Library (GSU, 2018).
- Feature classes of current expressways and current city limits (used to provide context). Obtained from Atlanta Regional Commission (ARC, 2018).
- Feature class of current land parcels for Fulton County (Fulton County, 2018). From this layer, parcels that intersect the study areas were extracted, and parcels that overlap the study area boundary were either removed from the dataset or clipped at the boundary.

The current parcels feature class mentioned above contained attributes for assessed value of land and assessed value of improvements. For mapping current land values, I further prepared the parcel dataset to exclude all tracts owned by government entities or utilities (which appeared to have artificially low values in many cases), as well as excluding parcels that had no assessment information, and homeowners' association parcels surrounding townhomes which had trivially small values. Upon examination, I noticed that this feature class contained some polygons that are abstract representations of condominium units which overlap the actual land parcel. These features contain the assessed value of improvements for each unit, which is useful, but they are not a true spatial representation, so I selected and exported them into a separate feature class. Then I spatially joined the condo features to the remaining parcel features which they intersect, producing a summarized value for each parcel representing the combined assessed improvement value of all condo records that intersect each such parcel. Then I created a new field in the parcels feature class to contain the sum of the parcel's total assessed value and the value of its corresponding condos where applicable, divided by the area of the parcel in acres. This produced a field with the total assessed value per acre for each land parcel in the study areas.



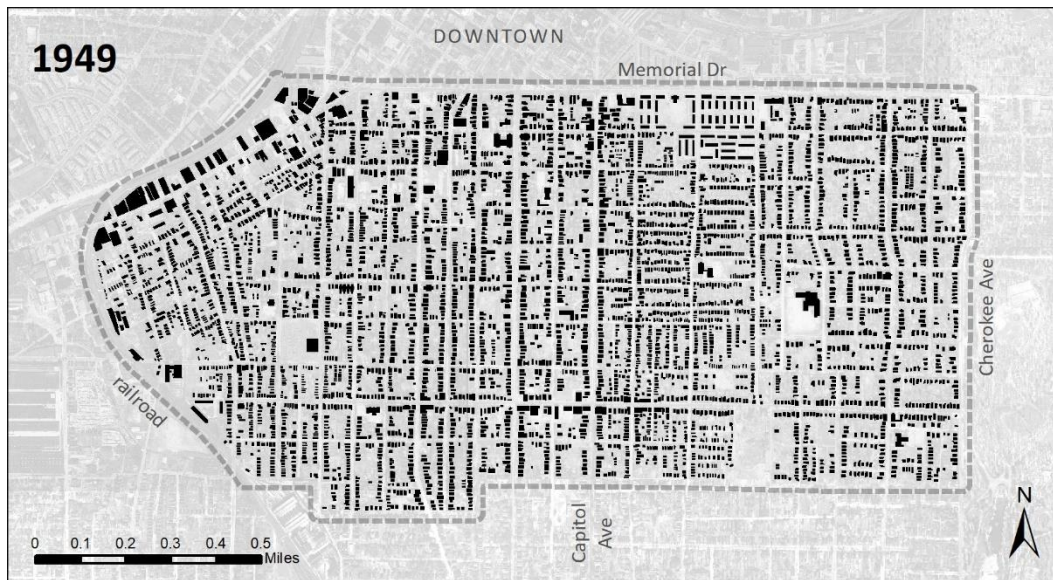
# Exploratory/Descriptive Mapping

The first main goal of this study is to visualize patterns and changes in the built environment. In this section I first provide discussion of the resulting patterns observed when mapping the aforementioned data. This is followed by maps illustrating these patterns, including “before and after” descriptive maps of the key physical elements of the urban environment for the two study areas.

The building footprint pattern from 1949 shows a consistent, relatively dense pattern of modest structures grouped close together, block after block, throughout Area 1. In comparison to the current pattern in Area 1, the drastic nature of twentieth-century demolitions that took place is evident. The current pattern contains vast areas that were previously inhabited but are now devoid of structures and instead occupied by highways and parking lots. Area 2 contained a similar pattern of small, modest, mostly single-family residences on tight lots in 1949, and this is largely still the case, although many homes that existed then have since been replaced by larger homes or low-rise apartment buildings.

Area 1’s historic land use pattern reflects a thorough scattering of small-scale commercial and high-density residential uses interwoven with mostly low-density residential. The overall pattern has a decidedly organic nature in the way uses and densities are mixed almost at random but with some consistency across the three neighborhoods. This has mostly been replaced today by larger, consolidated tracts devoted to subsidized housing, parks, and of course stadium parking and highways. Area 2 was not as varied in its land use pattern in 1949, but it has gradually gained scattered multi-family infill developments since then, and it has retained its few small-scale historic commercial hubs.

The 1949 street network for Area 1 also reflects the long-established traditional development pattern that was dominant in this part of the city. It was originally a very interconnected grid with some blocks divided into smaller half-size blocks. After construction of the Interstates and the associated realignment of many adjacent surface streets, many connections were obviously cut off. Also, some streets that formerly bisected blocks were eliminated, resulting in larger, consolidated tracts of land that are apparent in today’s street pattern. In Area 2, the southern portion exhibited a mostly regular grid pattern in 1949, which persists today, while the northern portion contained a less regular pattern with more curved streets that were still interconnected but not quite fully built out. Today the gaps in the pattern of Area 2 have been filled in with a few newer dead-end developments.



- Building footprints
- Study Area 1 boundary

Figure 6.  
Area 1:  
Building Footprint  
Pattern,  
1949 vs. current

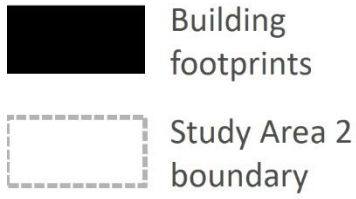
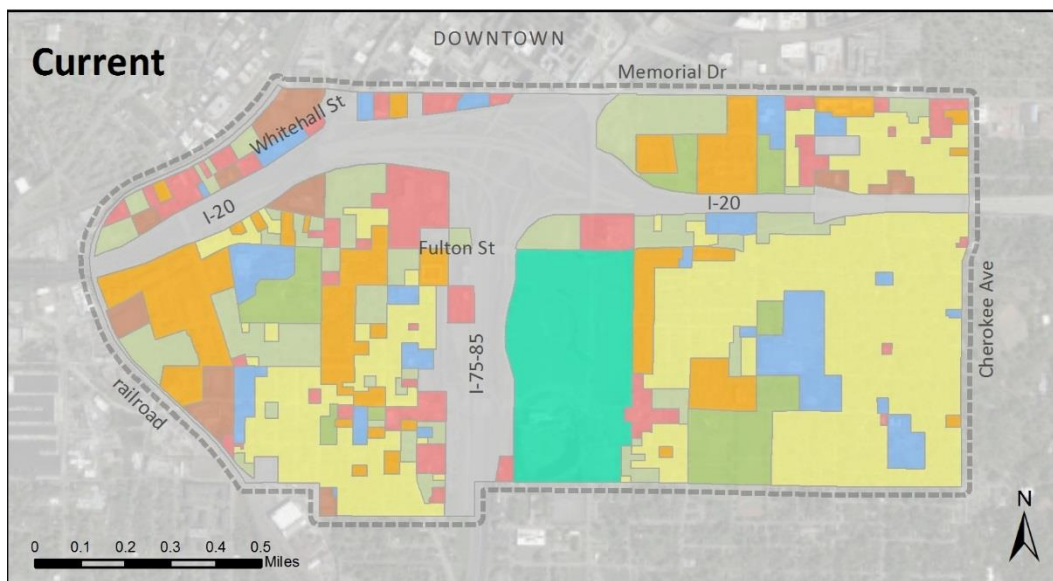
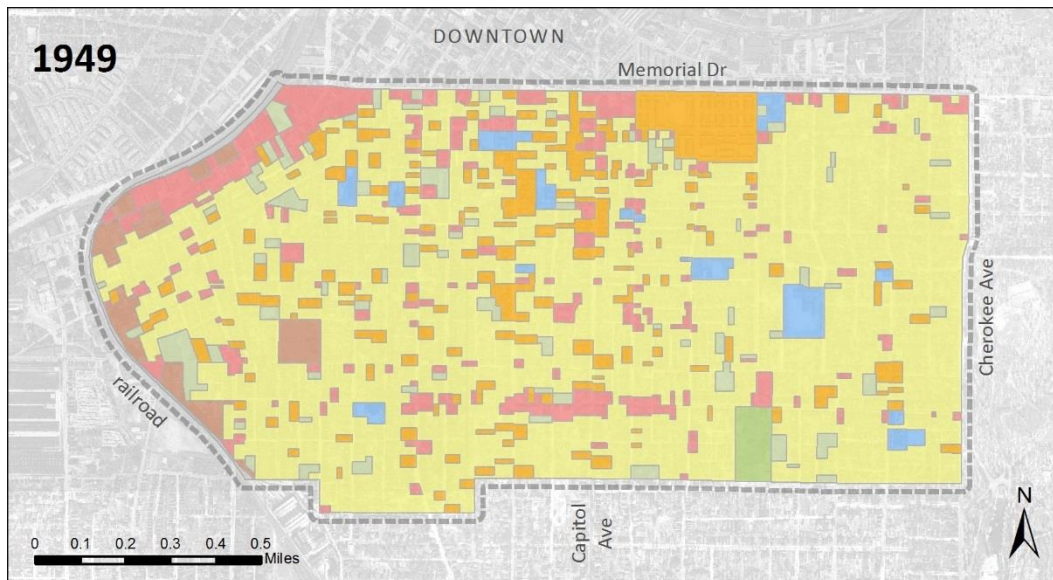


Figure 7.  
Area 2:  
Building Footprint  
Pattern,  
1949 vs. current





### Generalized land use categories

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<span style="display: inline-block; width: 15px; height: 15px; background-color: #d2b48c; border: 1px solid black;"></span> industrial	<span style="display: inline-block; width: 15px; height: 15px; background-color: #ffa500; border: 1px solid black;"></span> residential high
<span style="display: inline-block; width: 15px; height: 15px; background-color: #a9a9a9; border: 1px solid black;"></span> infrastructure (highway / RR / utility)	<span style="display: inline-block; width: 15px; height: 15px; background-color: #ffff00; border: 1px solid black;"></span> residential low
<span style="display: inline-block; width: 15px; height: 15px; background-color: #6495ed; border: 1px solid black;"></span> institutional	<span style="display: inline-block; width: 15px; height: 15px; background-color: #00ff00; border: 1px solid black;"></span> stadium
	<span style="display: inline-block; width: 15px; height: 15px; background-color: #d3d3d3; border: 1px solid black;"></span> vacant / undeveloped / open space

Study Area 1 boundary

*Figure 8.*  
*Area 1:*  
*Land Use Pattern,*  
*1949 vs. current*

### Generalized land use categories

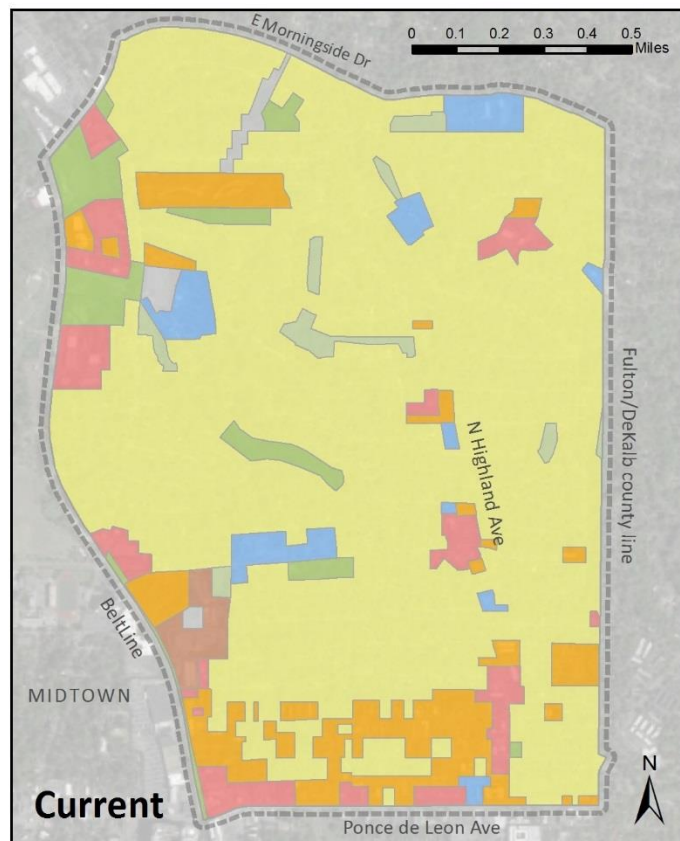
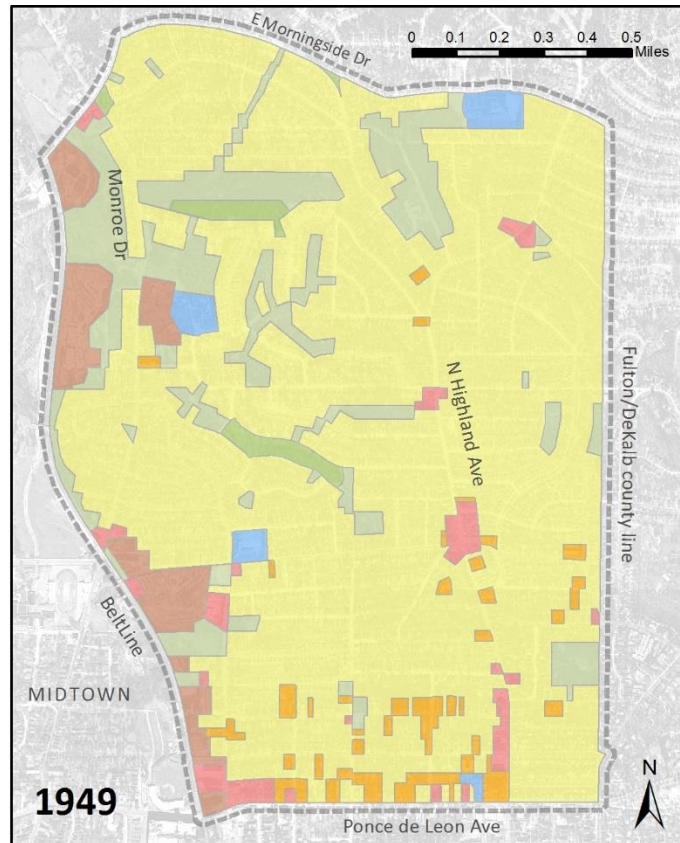
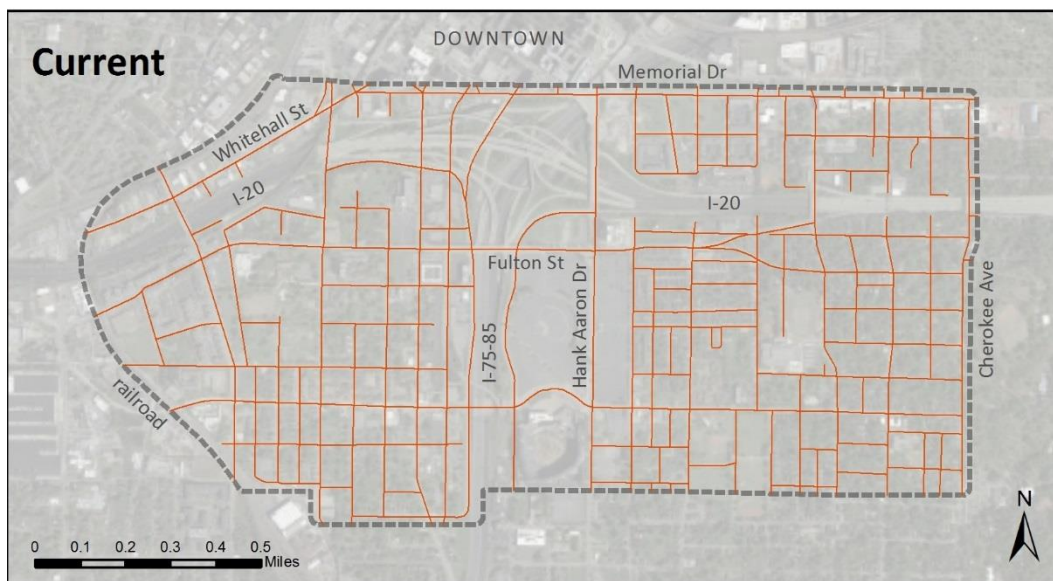
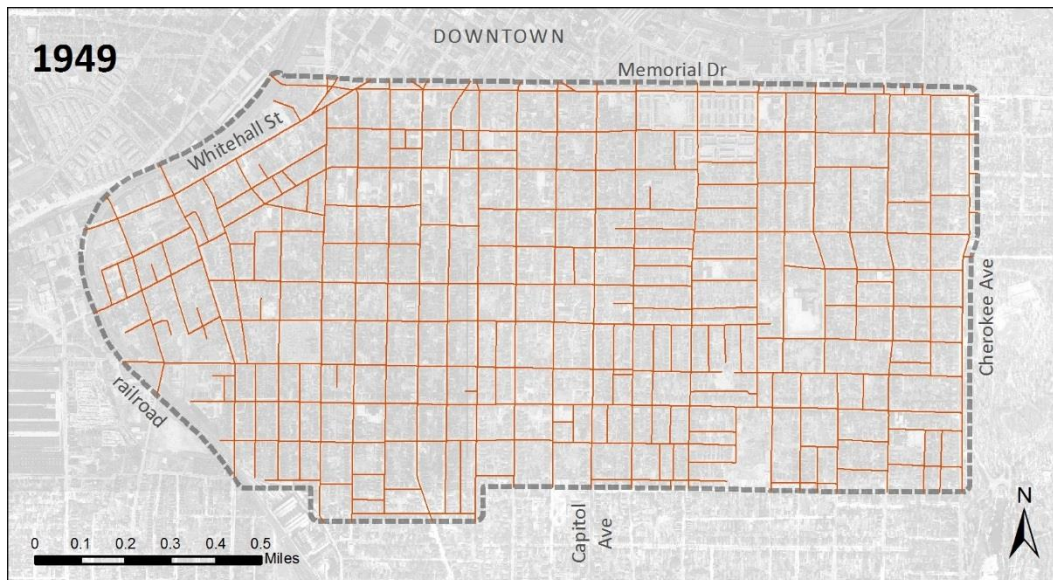


Figure 9.  
Area 2:  
Land Use Pattern,  
1949 vs. current





- Street network (excluding highways)
- - - Study Area 1 boundary

*Figure 10.*  
*Area 1:*  
*Street Network,*  
*1949 vs. current*

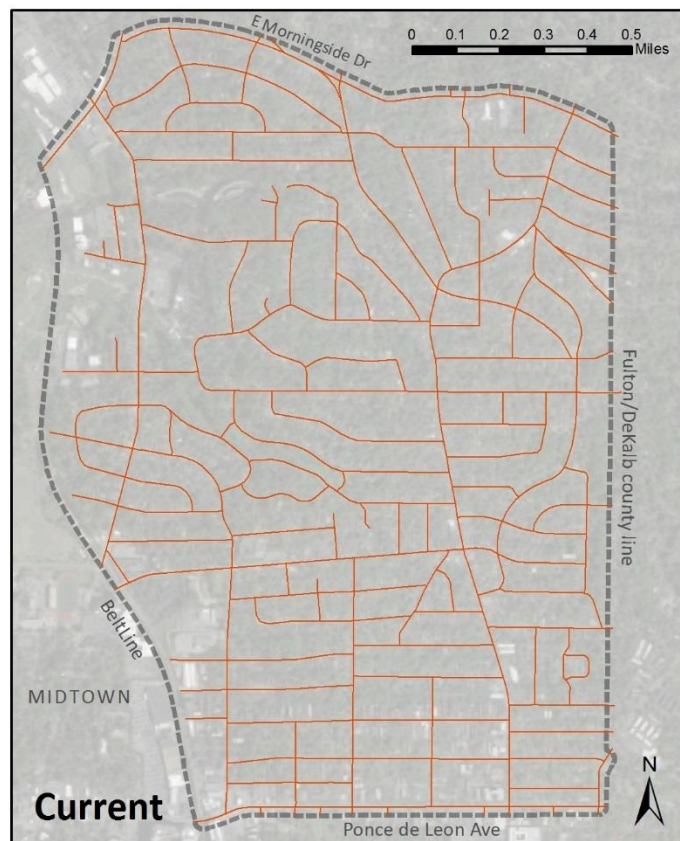
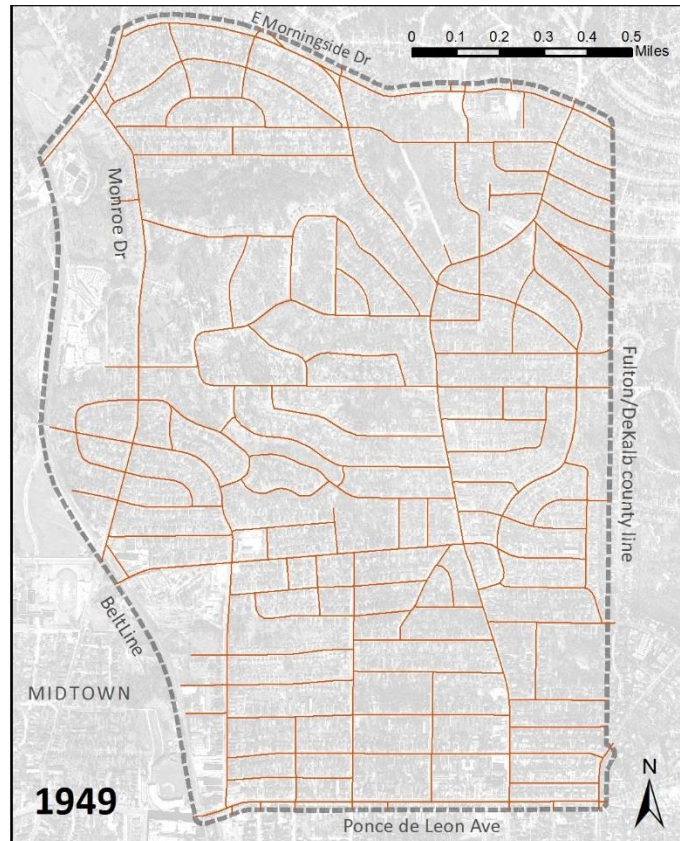
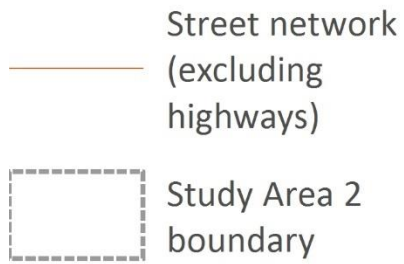


Figure 11.  
Area 2:  
Street Network,  
1949 vs. current

# Analysis

My second goal was to gain some further insight from the patterns that have been observed in the previous maps. In this section I analyze the historical and current data for both study areas, assessing measures of adherence to certain smart growth principles (which were described earlier), with tables and maps relevant to these measures. I also analyzed current land parcels to see how land values might be related to these patterns.

Considering building footprints, I took the study further than simply looking at the massing pattern of all buildings, by deriving a use attribute for each footprint. This was accomplished by performing spatial joins in ArcGIS with previously digitized land use polygons. I used this tool to assign each building footprint, historic and current, a land use categorical value based on which use polygon its centroid falls within. With this information, using ArcGIS (select by location) and Excel, I was able to calculate approximately how many historical structures of each use were demolished for highway construction, stadiums, and other developments in Area 1. I also calculated how many structures of each use would have hypothetically be demolished in Area 2 if the planned Interstate 485 had come to fruition. These numbers are as follows (note that percentages will vary if study area boundary is defined differently):

<b>Area 1: Land Use</b>	<b># Structures, 1949</b>	<b># Approx. structures demolished since 1949</b>		<b>% Demolished (Approximate)</b>		
		<b>For Interstate highways</b>	<b>For stadiums/ other uses</b>	<b>For Interstate highways</b>	<b>For stadiums/ other uses</b>	<b>Total</b>
Residential: single-family/ two-family	4390	817	1846	18.6%	42.1%	60.7%
Residential: apartment/ high-density	496	173	240	34.9%	48.4%	83.3%
Commercial	396	107	158	27.0%	39.9%	66.9%
Industrial	25	3	7	12.0%	28.0%	40.0%
Institutional	26	7	13	26.9%	50.0%	76.9%

*Table 2. Approximate Structures Demolished since 1949, Area 1*



Use	# Structures, 1949	# Structures planned for demolition for I-485 (hypothetical)	% Demolished (hypothetical)
Residential: single-family/two-family	3268	336	10.3%
Residential: apartment/high-density	99	8	8.1%
Commercial	91		
Industrial	37		
Institutional	9		

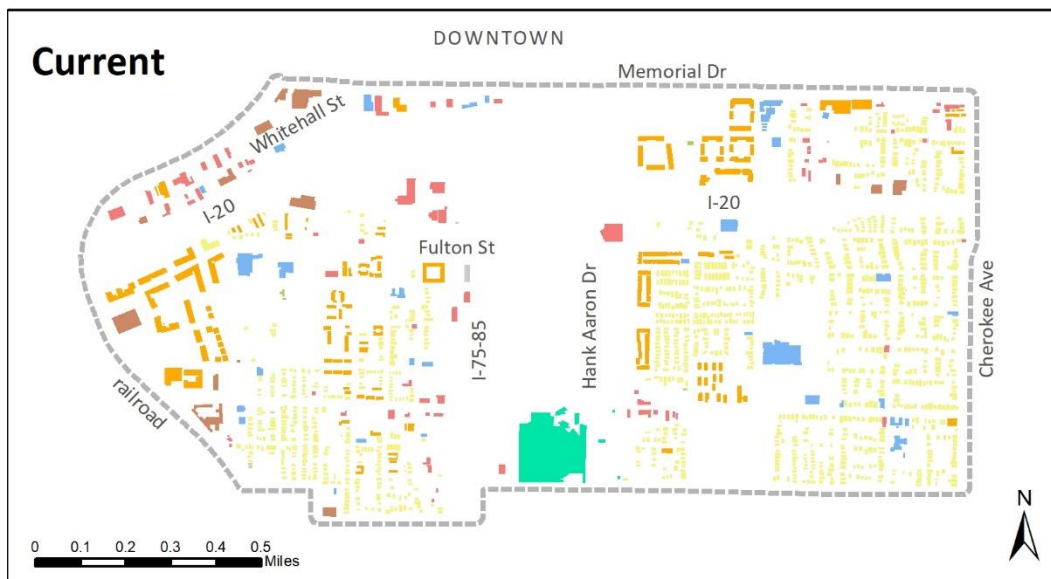
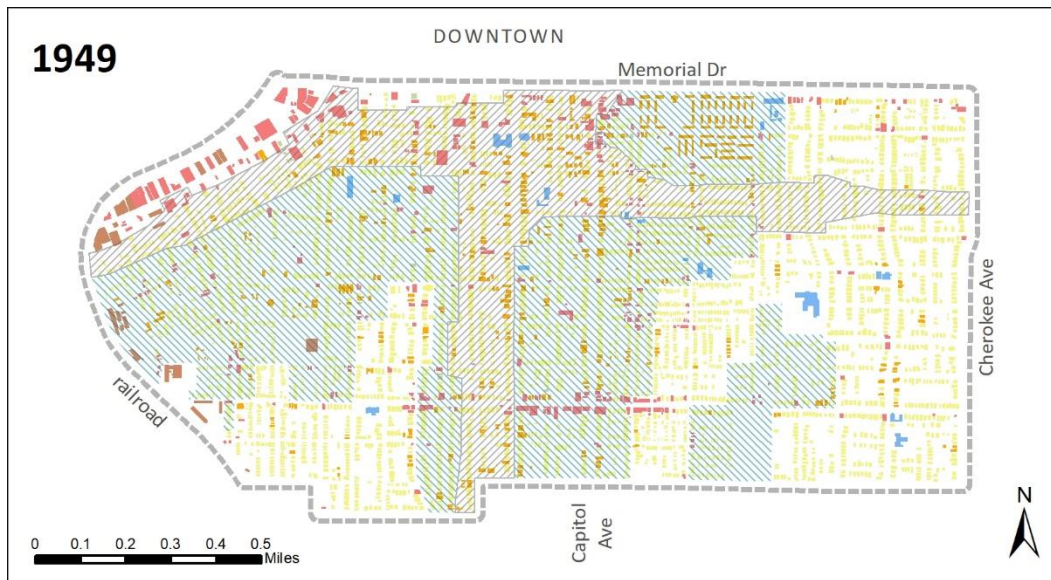
*Table 3. Approximate Hypothetical Structures Demolished for I-485, Area 2*

Another principle of vibrant urban development that I sought to analyze was granularity of land use patterns – that is, I sought to quantify the degree to which different uses and densities are mixed among each other in small increments, as opposed to large, monolithic swathes of one particular use. I considered using spatial analysis tools in ArcGIS that measure concepts such as clustering or spatial autocorrelation, but I concluded that most such tools and measures are designed for data with continuous numeric values. Thus, such types of analysis are not well-suited for measuring land use, which by nature uses a set of defined categorical values, as opposed to continuous data. However, when using the “eyeball test,” the drastically impacted patterns in land use described earlier are obvious in Area 1. The pre-Interstate land use pattern satisfied the goal of “fine grain” to a high degree, providing small, scattered commercial amenities at regular intervals among residential areas, along with scattered variety in density of residential uses. It should be noted that the scanned land use plan that this historical pattern was derived from contained many small pockets labeled “apartment” as opposed to single- or two-family residences, but in many cases, these appeared similar to single-family homes in the aerial imagery. This leads me to believe that homes may have been divided into multiple residential units, or homes with garage/accessory units may have also been labeled “apartment.” Still, the wide scattering of such dwellings among the lower density areas indicates a varied and vibrant neighborhood. In digitizing and verifying current land use patterns, I made the best possible effort to identify similar types of units as high-density, as opposed to low-density.

The third element of the built environment that I looked at was the street network. While streets remained virtually unchanged since 1949 in Area 2, Area 1 of course saw a large amount of disconnection and segmentation along with the developments that impacted its neighborhoods so heavily. I quantified these changes by measuring density of street intersections in Area 1 and also by mapping historic street segments crossing the current highway alignments that were cut off. Area 1 was essentially split from one cohesive urban fabric into 2 sizable, disconnected portions, and it was mostly disconnected from Downtown, by construction of the Interstates. Its apparent high density of intersections in 1949 was severely reduced, but it still managed to retain some interconnectivity instead of being redeveloped as cul-de-sac subdivisions. To quantify how many street connections were lost due to highway construction in Area 1, I used the Expressways feature class (ARC, 2018), as highway centerlines, and then used Select by Location in ArcGIS to find how many features cross the centerlines in the 1949 street network and how many features cross the centerlines in the current street network. The results of these measurements are presented in subsequent maps.

This study stops short of trying to establish causal links between any of these physical patterns and social or economic outcomes which are likely to be linked. However, I also analyzed parcel-level current land values to inform such questions. As expected, land values (measured as total assessed value of land plus all improvements including condominium units) were considerably higher in Area 2, though they form a somewhat inconsistent, varied pattern there. In the eastern portion of Area 1, some higher values are present, but in the very disconnected parts of Mechanicsville, values are especially depressed along with large swathes of apparently vacant land.

The following pages present maps showing analytical results for building use and demolition, street interconnectivity, and land values as described in this section.



**Building footprints by use**

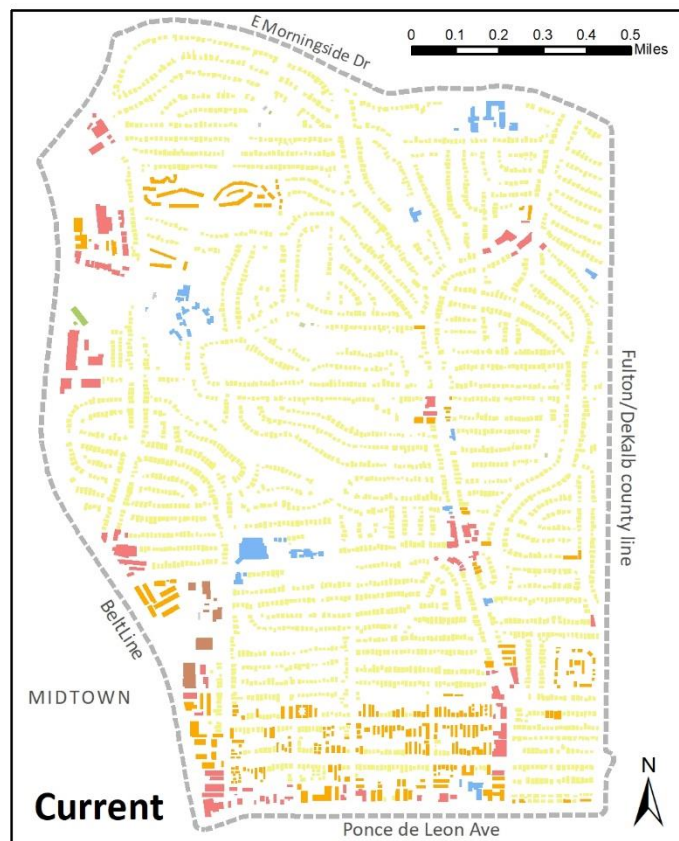
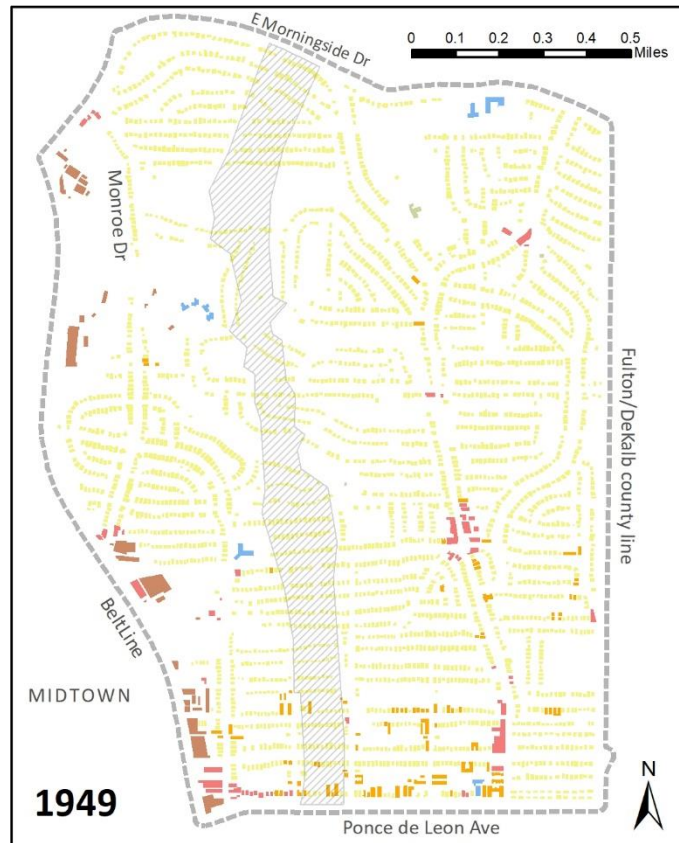
- commercial
- industrial
- infrastructure (hwy / RR / utility)
- institutional
- park
- residential high
- residential low
- stadium
- vacant / undeveloped / open space

**Areas demolished since 1949**

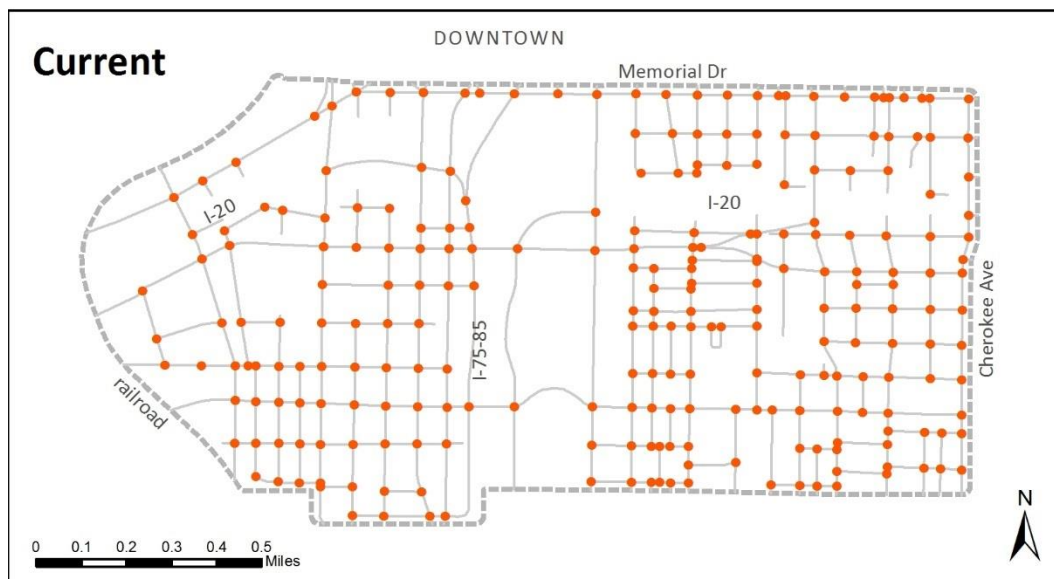
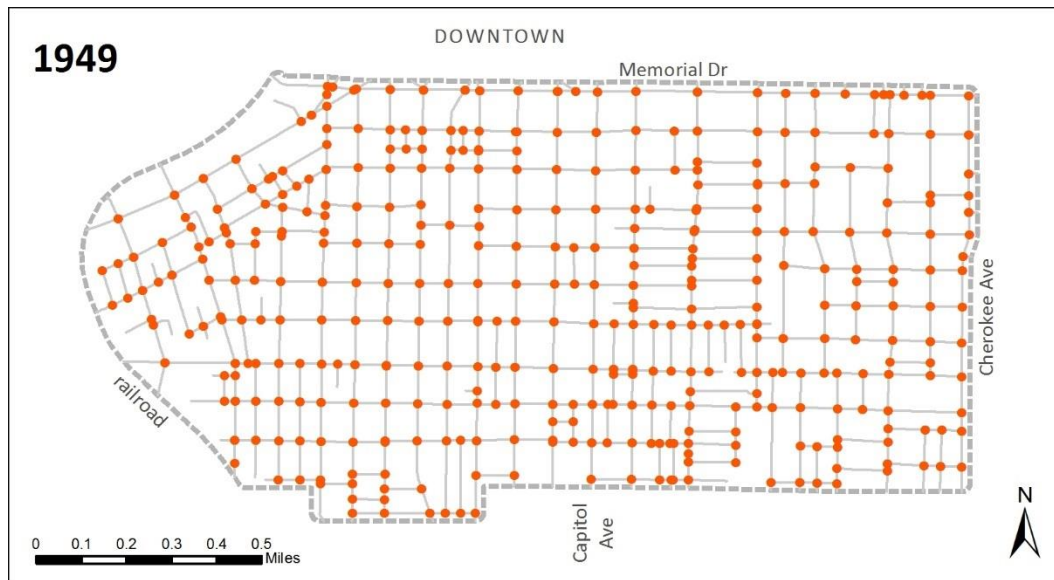
- highway
- stadium / other
- Study Area 1 boundary

*Figure 12. Area 1:  
Building Footprints by Use  
with Areas Demolished  
1949 vs. current*

### Building footprints by use



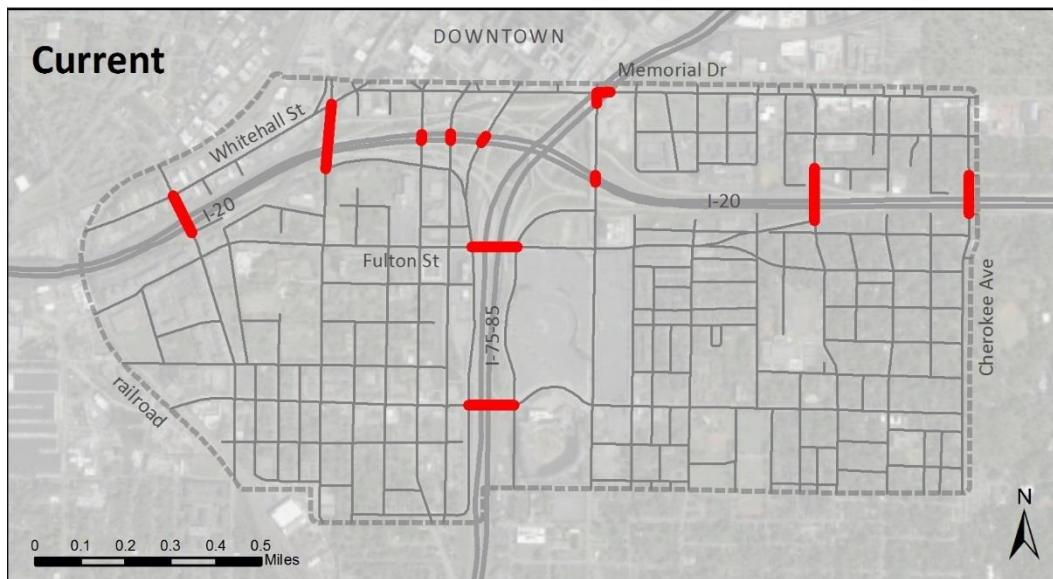
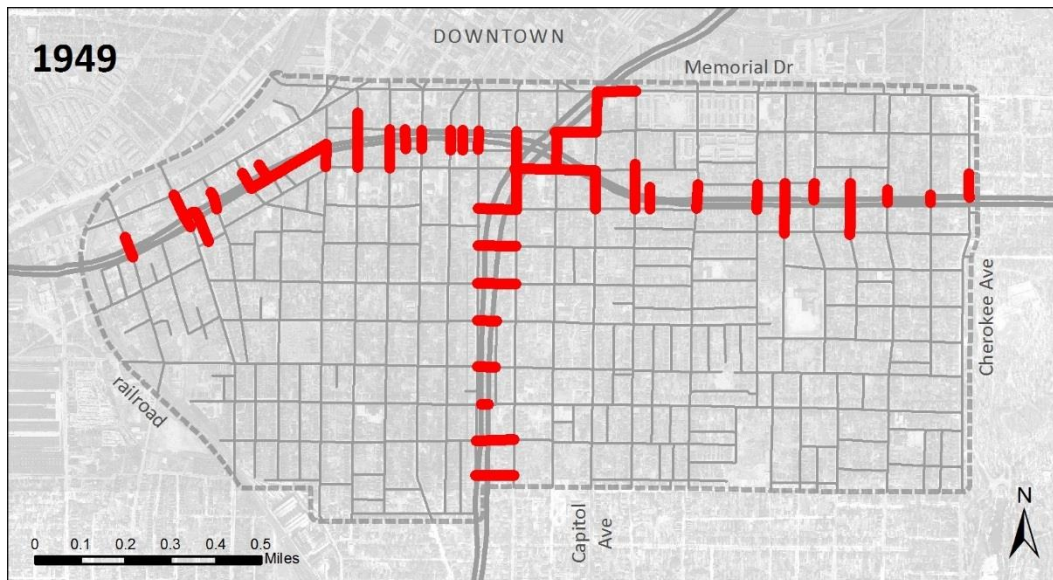
*Figure 13. Area 2:  
Building Footprints by Use  
with Hypothetical  
Demolished Area  
1949 vs. current*



- Street intersection point
- Street network
- ▭ Study Area 1 boundary

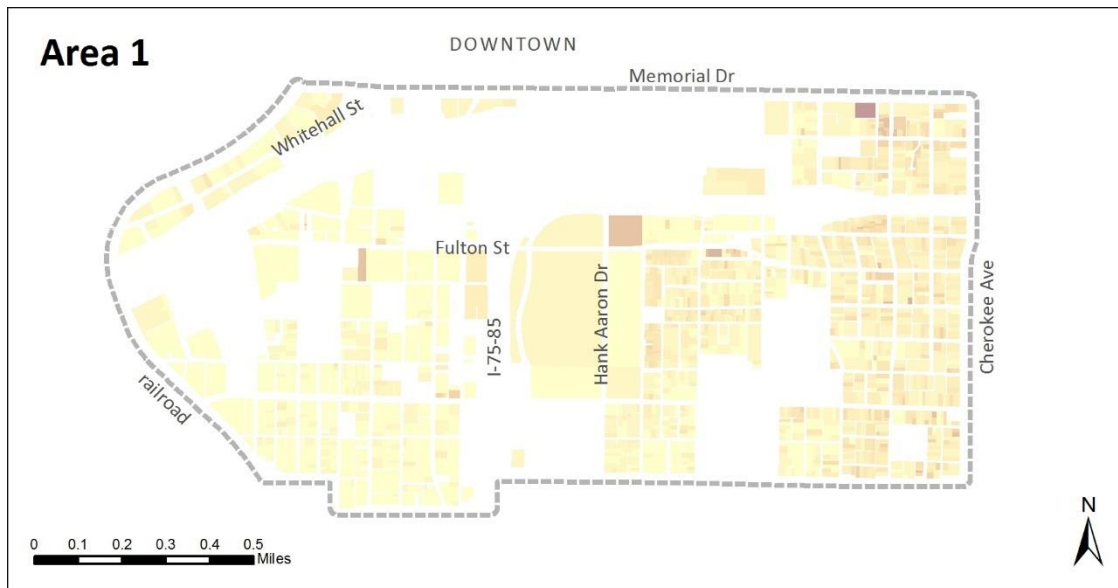
Figure 14.  
Area 1:  
Street Intersection Points  
1949 vs. current





- Street segments crossing current location of Interstates
- Current alignment of Interstate highways
- Surface street network
- Study Area 1 boundary

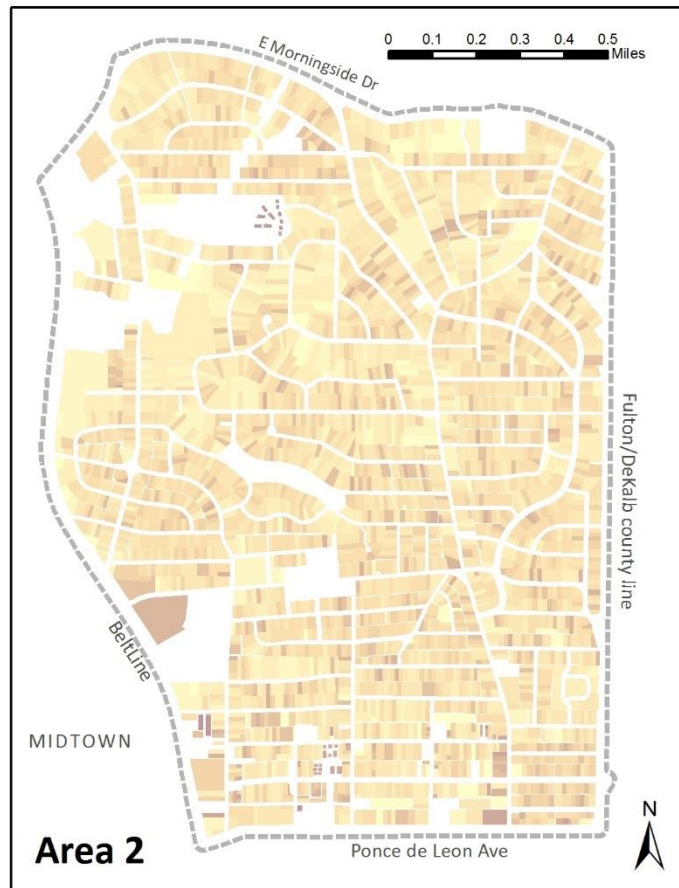
*Figure 15.  
Area 1:  
Severed Street  
Connections,  
1949 vs. current*



**Total Assessed Value per Acre (Land + Improvements)**



Study area boundaries



*Figure 16. Area 1 & Area 2:  
Current Land Parcels with  
Total Assessed Value (excluding govt. land)*

## Caveats/Further Study

There are, of course, considerations that could make a study like this more useful, which unfortunately are lacking due to time constraints and availability of historic data. First, while I mapped and studied building footprints, it would be even more useful to know which of these footprints were occupied in the pre-Interstate era as well as currently. For example, there is a cluster of historic commercial buildings in Summerhill, along Georgia Avenue, which mostly remain today but in an abandoned state. It would be interesting for the viewer to know if the footprints on the map are actually functional buildings or not. Second, this study could be extended by examining relationships between the physical development patterns and demographic/economic indicators for the study areas. Even without data like census figures, it is generally common knowledge and fairly obvious to any Atlanta resident that Area 2 (Virginia Highlands/Morningside) has experienced far better economic outcomes than Area 1 (especially Summerhill/Mechanicsville) since the mid-twentieth century. It would be interesting to find the extent to which these outcomes can be linked to physical patterns of urban form like land use and street connectivity, and how much they are caused by other factors like zoning policies, racially entrenched generational wealth, racially biased “redlining” policies with regards to mortgage lending, etc. I would expect to find that all of these things are interrelated to some degree.

## Conclusion

The exploratory mapping and analysis provided in this study are really intended as more of an eye-opener, a jumping off point for further discussion, than a solid conclusion. I was inspired by the current distressed state of the neighborhoods in Area 1, particularly Summerhill and Mechanicsville, to discover what these neighborhoods formerly were, and what might have contributed to their current experience of widespread disrepair and poverty. Regardless of what policies may lead to a particular planning decision, the physical reality left behind is what really matters in the end, as physical built forms surely have some effect on the success or failure of the people who inhabit places. By spatially comparing the evolution of two separate parts of Atlanta – one that was heavily impacted by massive infrastructure and development projects, and one that might have been but was spared – this study makes it clear that destructive effects of planning decisions can still be felt long afterward.



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# Appendix

The following Python code was used for some steps in the analysis, including joining land use attributes to buildings, joining demolition status to buildings, and generating street intersection points. I performed two of the same operations for 1949 data and current data, so it was helpful to be able to reuse the code.

```
import arcpy as a

# Establish variables
ws1949 = "D:/CP_6950_Capstone/PROJECT/data_past/data_past.gdb/
        data_1949_GAwest"
ws2018 = "D:/CP_6950_Capstone/PROJECT/data_current/data_current.gdb/
        data_current_GAwest"

bldg1949 = "bldgs_1949"
use1949 = "land_use_1949_dissolve"
street1949 = "roads_1949_from_1928"
demo1949 = "demo_1949"

bldg2018 = "bldgs_fulton_dekalb_AOI"
use2018 = "land_use_current_dissolve"
street2018 = "Streets_TIGER_2014_AOI_Surface"

#####

# Set workspace for 1949 data
a.env.workspace = ws1949

# Join land use attribute(s) to bldgs. based on where building
# centroid falls
a.SpatialJoin_analysis (bldg1949, use1949, "bldgs_use_1949",
                        match_option="HAVE_THEIR_CENTER_IN")

# Join demolition layer attributes to buildings, to determine which
# buildings were removed between 1949 and now, for various categories
# of removal.
a.SpatialJoin_analysis ("bldgs_use_1949", demo1949,
                        "bldgs_use_demo_1949", match_option="HAVE_THEIR_CENTER_IN")
```

```

# Create street intersection points
a.Intersect_analysis (street1949, "intersections_1949",
                      output_type="POINT")

#####

# Set workspace for current data...
a.env.workspace = ws2018

# Join land use attribute(s) to bldgs. based on where building
# centroid falls
a.SpatialJoin_analysis (bldg2018, use2018, "bldgs_use_2018",
                        match_option="HAVE_THEIR_CENTER_IN")

# Create street intersection points
a.Intersect_analysis (street2018, "intersections_2018",
                      output_type="POINT")

```